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# THE MINNESOTA GEOLOGIST

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OFFICIAL BULLETIN  
OF

THE GEOLOGICAL SOCIETY OF MINNESOTA

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VOL III

SEPTEMBER 15th, 1946

No. 5

MIDWEST FEDERATION OF GEOLOGICAL SOCIETIES

CONVENTION

MINNEAPOLIS MINNESOTA

1946

GEOLOGICAL SOCIETY OF MINNESOTA

831 SECOND AVENUE SOUTH  
MINNEAPOLIS 2, MINNESOTA

The Society is devoted to the study of GEOLOGY  
and MINERALOGY for their cultural value.

OFFICERS

Dr. Edward H. Mandell, President	Fred L. Wunderlich, Director
Chas. H. Preston, Vice President	Leone Patricia Knox, Director
Mary Lupient, Treasurer	George A. Rickert, Director
Loretta E. Koppen, Sec'y & Ass't Editor	Joseph W. Zalusky, Director
Alger R. Syme, Editor	

FOUNDER

Edward P. Burch

PAST PRESIDENTS

Junior F. Hayden  
Alger R. Syme  
Charles H. Preston  
Joseph W. Zalusky

MEETINGS: October to May inclusive, 7:30 P.M. every Monday,  
not a holiday, large auditorium, 4th floor, Public Library,  
Hennepin Avenue and 10th Street, Minneapolis, Minnesota.

FIELD TRIPS: June until September inclusive. Visitors are  
very welcome, always.

ANNUAL DUES: Residents of Hennepin and Ramsey Counties \$3.00  
plus \$1.00 additional for husband, wife, or dependant fam-  
ily members; for students and non-residents, \$1.00.

Affiliated with  
MID WEST FEDERATION OF GEOLOGICAL SOCIETIES

ANNUAL MEETINGMID WEST FEDERATION OF GEOLOGICAL SOCIETIES

On Saturday and Sunday, October 19th and 20th, 1946, the Geological Society of Minnesota will act as host to the various groups constituting the Mid West Federation of Geological Societies. Members include the Marquette Geological Society, Chicago, Illinois; Wisconsin Geological Society, Milwaukee, Wisconsin; The Geological Society of Minnesota, Minneapolis, Minnesota; The Joliet Mineralorists, Joliet, Illinois; Michigan Mineralogical Society, Detroit, Michigan; and several other Societies now in the process of joining. We anticipate that this meeting will be one of the Society's best meetings, at least we intend to make it so, if possible. The Minneapolis meeting will give our members an excellent opportunity to meet those with kindred interests from other societies to form contacts and friendships which may develop and be appreciated more as time goes on, to exchange view points, and to enlarge their geological horizon. The program is printed herein. It should be understood that this program is flexible and that there may be a few surprises which you will enjoy. We hope that all our members will attend all meetings of the Convention. The Federation is young and as yet is only in the creeping stage. We feel fully confident that it will expand and grow within the next few years, and that in due time it will ripen into a national organization. Those residing in Minneapolis welcome the Federation and sincerely trust that our guests will feel that their time and energy have been well spent.

This number of the Bulletin is devoted exclusively to the Federation and its Annual Meeting. We have tried to give our guests and the Society members as much geological information regarding our community as possible. While prepared especially for the Convention, we hope our members will find this number both interesting and useful.

GRAND CANYON TRIP

We regret that the available space prohibits us from giving you a detailed account of the ambitious project undertaken by Past President Charles H. Preston, in leading the trip to the Grand Canyon of the Colorado. Twenty-eight of our members assembled in Salt Lake City on August 26th and saw and heard enough geology to keep them busy for some time. The trip was a complete success in every way, and we intend to give you a special detailed report prepared by Mr. Preston in the very near future.

GEOLOGICAL SOCIETY OF MINNESOTA1946-7 LECTURE COURSE

The first meeting of the Geological Society of Minnesota will be held on Monday, October 28th. Dr. George M. Schwartz, Professor of Geology, University of Minnesota, will begin his series of lectures on "Economic Geology". You all know Dr. Schwartz and how fine his lectures were last year. The program appears elsewhere herein. "Nuff said".

MID WEST FEDERATION MEETINGS

All meetings of the Federation to be held on October 19th, 1946, will be held in the Museum Auditorium on the Fourth Floor of the Public Library at 10th Street and Hennepin Avenue, Minneapolis, except the banquet.

MID WEST FEDERATION OF GEOLOGICAL SOCIETIES

OFFICERS  
1945-1946

PRESIDENT:      Alger R. Syme, Minneapolis, Minnesota.  
VICE-PRESIDENT: Maynard E. Leatsler, Joliet, Illinois.  
SECRETARY:        Frank H. Nelson, Milwaukee, Wisconsin.  
TREASURER:       William E. Mensel, Chicago, Illinois.

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Chicago, Illinois.

J. O. Montague, Milwaukee, Wisconsin.

MEMBER SOCIETIES

THE JOLIET MINERALOGISTS,  
Joliet, Illinois.

MARQUETTE GEOLOGICAL SOCIETY,  
Chicago, Illinois.

WISCONSIN GEOLOGICAL SOCIETY,  
Milwaukee, Wisconsin.

MICHIGAN GEOLOGICAL SOCIETY,  
Detroit, Michigan.

THE GEOLOGICAL SOCIETY OF MINNESOTA,  
Minneapolis, Minnesota.

MID WEST FEDERATION OF GEOLOGICAL SOCIETIES

THE JOLIET MINERALOGISTS  
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Lecturer Frank L. Fleener

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Mrs. W. E. Platte

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Vice-President L. R. Bacon  
Secretary Eloise Goddard  
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GEOLOGICAL SOCIETY OF MINNESOTA  
Minneapolis, Minnesota

President Dr. Edward H. Mandell  
Vice-President Charles H. Preston  
Secretary Loretta E. Koppen  
Treasurer Mary Lupient  
Editors Alger R. Syme  
Loretta E. Koppen  
Founder Edward P. Burch (deceased)

TENTATIVE PROGRAM FOR THE 1946 MEETING OF  
MID WEST FEDERATION OF GEOLOGICAL SOCIETIES  
MINNEAPOLIS, MINNESOTA, OCTOBER 19TH AND 20TH, 1946

There will, undoubtedly, be changes in the program, but the character and substance will remain unchanged.

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SATURDAY MORNING, OCTOBER 19TH, 9:30 A.M.

Fourth Floor, Public Library,  
Hennepin Avenue at 10th Street

BUSINESS SESSION:

1. REPORTS - President, Treasurer, Secretary, and Editors of Society Journals.
2. REPORT of Nominating Committee, and election of officers.
3. DISCUSSION:
  - (a) Advisability of establishing some form of a Society Bulletin.
  - (b) Ways and means of securing better cooperation between the Societies, particularly with reference to exchange of information, data, and etc.
  - (c) Advisability of taking definite steps to form a national society.
  - (d) Advisability of establishing certain standing committees.
4. SUGGESTIONS, new business, and new proposals.
5. STUDY of the building stones of the Minneapolis Loop walking (If time permits.)

SATURDAY AFTERNOON, OCTOBER 19TH, 1:30 P.M.

1. MINERAL EXHIBIT; explanation - 30 minutes.
2. LECTURE; "Grand Canyon of the Colorado" geology by Charles H. Preston, Past President Minneapolis Society, illustrated with maps and drawings - 20 minutes. Colored Pictures, Junior F. Hayden, Past President Minneapolis Society - 20 minutes.
3. LECTURE; "Cutting and Polishing" by William J. Bingham, President Minnesota Mineral Club - 20 minutes.

4. LECTURE; "Geyser of Yellowstone Park" geology, and beautiful colored pictures by Junior F. Hayden, Past President Minneapolis Society - 30 minutes.
5. LECTURE; "The Quartz Family" by Ben Hux Wilson of Joliet, Illinois, Contributing Editor to the "Mineralogist" - 20 minutes.
6. SIGHT-SEEING TOUR - 4:00 to 5:00 o'clock including old water courses of the Mississippi River, St. Anthony Falls, and Glacial Ice Block Lakes within the City. Leader Joseph W. Zalusky, Past President Minneapolis Society.

SATURDAY EVENING, OCTOBER 19TH

BANQUET: Curtis Hotel 6:00 P.M. \$2.00

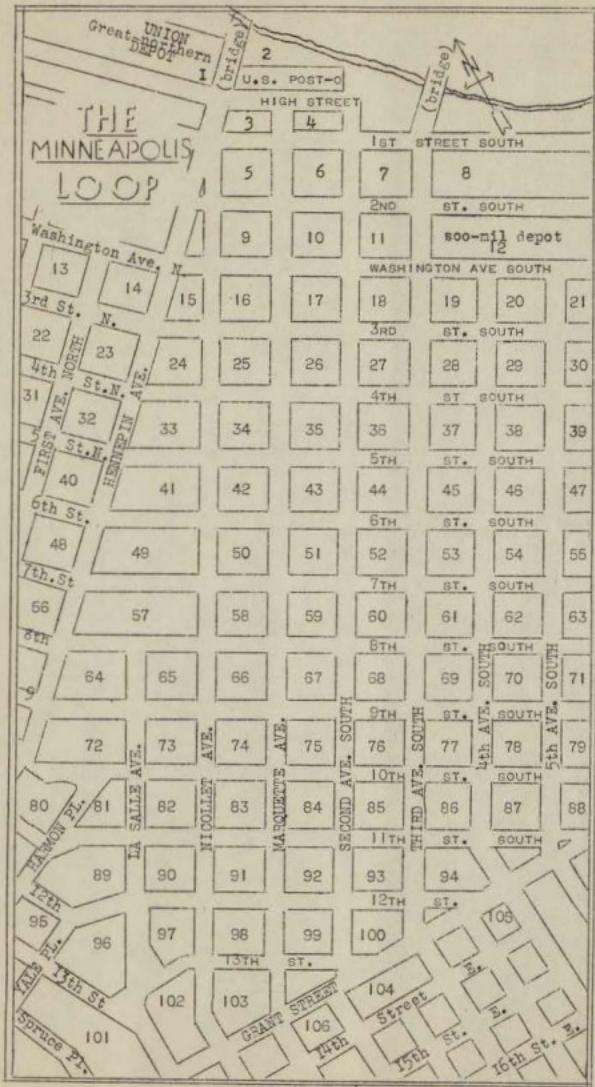
Program:

1. Introductions; officers, guests, and others.
2. Responses by representatives of Societies; introduction of new officers.
3. Lecture; "The Birth of a Volcano" Paricutin, Mexico, with colored moving pictures taken both on the ground and from an air-plane, geology and lecture by Professor L. B. Lawrence of the University of Minnesota.

SUNDAY MORNING, OCTOBER 20TH, 9:30 A.M.

FIELD TRIP: Meet promptly at 10th Street entrance to Public Library. The trip will include:

1. Inspection of good type section of the St. Peter Sandstone, Ordovician Age. Lecture; 10 minutes by Alger R. Syme.
2. Inspection of good section of Flatteville Limestone (quarry), Ordovician Age. Collect fossils, lecture by E. H. Brown, 10 minutes.
3. Inspection of Fossil Falls of the Mississippi, Minnehaha Park, lecture by Joseph W. Zalusky, Past President of Minneapolis Society - 10 minutes.
4. LUNCH.
5. View of the Valley of Glacial River Warren, now Valley of the Minnesota River.
6. Visit shale pits (Decorah Shale, Ordovician Age), Twin City Brick Company, St. Paul, collect fossils, lecture by Miss Thelma Sneed - 10 minutes.



GEOLOGICAL SOCIETY OF MINNESOTA  
MINNEAPOLIS LOOP DIRECTORY

	Block No.		Block No.
<u>AUTO CLUB:</u> 1305 LaSalle	102	<u>HOTELS:</u>	
<u>BANKS:</u>		Curtis, 10th & 3rd Ave. So.	86
Farmers & Mechanics, 20 S. 6th St.	42	Dykeman, 27 6th St. So.	49
1st National, 5th & Marquette	43	Frances Drake, 10th & 5th Ave. So.	78
Marquette National, 517 Marquette	43	Leamington, 10th & 3rd Ave. So.	85
Midland National, 405 2nd Ave. So.	36	Nicollet, Nicollet & Washington	15
Northwestern National, 620 Marquette	50	Radiisson, 45 7th St. So.	57
		Sheridan, 1112 Marquette	83
<u>CHURCHES:</u>		<u>LIBRARY:</u>	
Baptist, 1020 Harmon	80	Convention Meetings, Hennepin at	
Catholic Basilica, Hennepin &	16	10th	80
" St. Olaf, 805 2nd Ave. So.	68		
Episcopal Cathedral, Hennepin &		<u>RESTAURANTS:</u>	
Oak Grove	-	Charlies, 716 4th Ave. So.	61
" 905 4th Ave. So.	78	D'Napoli, 816 Hennepin	-
Lutheran, 4th Ave. So. & Grant	105	Forum, 36 7th St. So.	49
Methodist, Lyndale & Hennepin	-	Grill, 85 9th St. So.	74
" Grant & Marquette	106	Harry's, 74 11th St. So.	82
Presbyterian, 1205 Nicollet	98	Millers, 20 7th St. So.	49
<u>DEPARTMENT STORES:</u>		Richard's Treat, 114 6th St. So.	43
Baker's, Nicollet	42	Stouffers, 89 7th St. So.	58
Bjorkman's, Nicollet	83	YMCA, 30 9th St. So.	64
Dayton's, Nicollet	57		
Donaldson's, Nicollet	50	<u>THEATRES:</u>	
Harold's, Nicollet	65	Century, 40 7th St. So.	49
Justers, 43 6th St. So.	49	Lyric, 711 Hennepin	57
Powers, Nicollet	34	Newsreel, 729 Hennepin	57
Thomas', Nicollet	66	Orpheum, 910 Hennepin	-
Young-Quinlan, Nicollet	74	Radio City, 36 9th St. So.	65
<u>DEPOTS:</u>		RKO Pan, 704 Hennepin	56
Bus Depot, 29 7th St. N.	56	State, 805 Hennepin	64
Union RR Depot, foot of Hennepin Ave	1	World, 16 7th St. N.	48
Milwaukee-Soo, 3rd Ave. &			
Washington	12	<u>TOURIST INFORMATION:</u>	
		Washington Avenue South	
		Opposite Nicollet Hotel	

BUILDING STONE - MINNEAPOLIS BUILDINGS

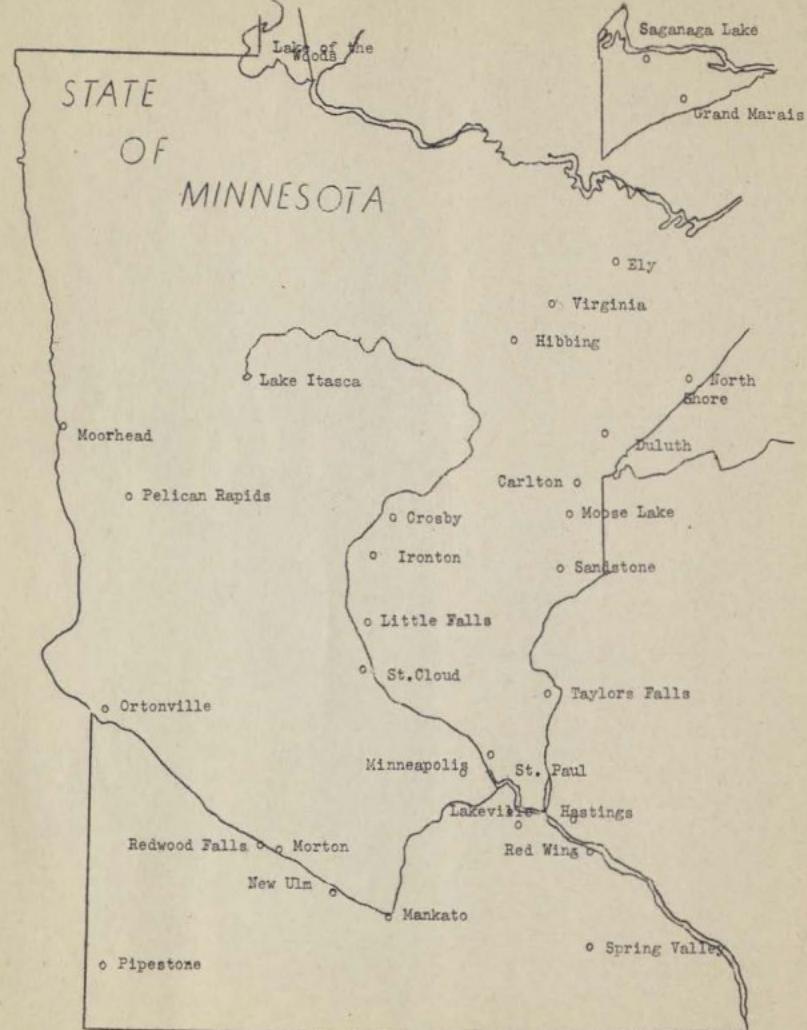
<u>Block No.</u>	<u>Building</u>	<u>Stone</u>
(Arranged according to block number on accompanying map)		
1	Union Depot	Hinckley Sandstone
2	U. S. Post Office	Base - St. Cloud Gray Granite Above - Mankato Dolomite
26	Metropolitan Life Building 3rd and 2nd Avenue South	Base - Ortonville Granite Above - Fond du Lac Sandstone
26	Oneida Bldg., 4th & Marquette	Fond du Lac Sandstone, good example
33	Lumber Exchange Bldg., 5th & Henn.	Fond du Lac Sandstone
34	Powers Dept. Store 5th and Nicollet	Base - Morton Gneiss Above - Kasota Stone - Dolomite
35	Hudson Bldg., 2nd Ave. S. & 4th St.	Base - Indiana Limestone
35	Boutella's, 5th & Marquette	Base - St. Cloud Red Granite
36	N. W. Bell Telephone Bldg. 3rd Ave. S. and 5th Street	Base - Morton Gneiss - fine example Above - Kasota Dolomite
37	Court House 3rd Ave. S. - 4th to 5th	Ortonville Granite Polished blocks in 4th St. entrance
42	Baker Co., Nicollet 5th to 6th	Base, West End - Black Gabbro, Ashland, Wis. 1st story - Kasota Dolomite Base, East End - St. Cloud Rockville Granite Rockville Porphyritic Granite - good example
42	Federal Reserve Bank Bldg. 5th and Marquette	Base - Red Granite, Milbank, S. D. Above - Kasota Dolomite
42	Farmers & Mechanics Bank 6th and Marquette	Entrance - Montana Travertine
43	First Nat. Bank Bldg. 513 Marq.	Base - Rockville Granite (good example)
43	First Nat. Bank Bldg. Corner 5th and Marquette	Base - St. Cloud Pink (coarse) Granite
43	Rand Tower, 6th and Marquette	Base - St. Cloud Gray Granite Above - Indiana Limestone (Fine Marble in Lobby)
43	Marquette Nat. Bank Bldg. 517 Marquette	Base - St. Cloud Pink Granite Above - Handmade Red Sandstone (unknown)
44	Frontenac Bldg., 509 2nd Ave. S.	Base - Rockville Minnesota Granite Above - Indiana Limestone
49	Kresge Bldg., Nicollet & 7th	Base - Rockville Porphyritic Granite
50	N. W. National Bank Bldg. 620 Marquette	Entrances on 6th & 7th Vermont Gray Granite Base - Black Gabbro, Mellon, Wis.
51	Metropolitan Bank Bldg. 6th & Second Avenue South	Base - Rockville Porphyritic Granite Fine Example
57	Daytons Dept. Store	Base - St. Cloud Pink Granite
58	Woolworths, Nicollet & 7th	Base - Black Gabbro, Mellon, Wis. (fine example) Above - Indiana Limestone
58	Physicians & Surgeons Bldg. 7th and Marquette	Base - Rockville Porphyritic Granite Entrance - Mankato Dolomite
59	Jewish Club, 2nd Ave. S. 7 & 8th	Base - Buff Kasota Stone - good example (new)
59	Minneapolis Gas Light Co. 8th and Marquette	Entrance - Morton Gneiss - good example
59	Boncake Bldg., 7th & Marquette	Base - St. Cloud Pink Granite
59	Baker Bldg., 7th & 2nd Ave. S.	Above - Indiana Limestone Base - Morton Gneiss (fine example) Above - Kettle River (Hinckley) Sandstone

<u>Block No.</u>	<u>Building</u>	<u>Stone</u>
65	Albrecht Fur Co., Nic. 8th to 9th	Base - Rockville Granite
65	Harolds, Nicollet 8th to 9th	Mankato Buff Dolomite
66	Medical Arts Bldg. 9th and Nicollet	Base - Isle Granite - good example
66	Jacobs Jewelry Store, 811 Nic	Morton Gneiss in panels - good example
67	Foshay Tower	Base - Rockville Granite - very fine example
68	St. Olaf's Church, 8th & 2nd Ave.	Indiana (Bedford) Limestone Flatteville Limestone, lower beds Ordovician Age
73	Home Trade Shoe Co., 924 Nicollet	Polished Tan Mankato Dolomite
74	Ivey Candy Stores, 924 Nicollet	Base - Rockville Granite
74	Phelps Bldg., 923 Nicollet	St. Cloud (coarse) Pink Granite
74	Young & Quinlans, 9th & Nicollet	Mankato Dolomite - good example
82	Chatham Bldg., 1008-14 Nicollet	Winona Type Buff Dolomite Limestone
83	Ladd Bldg., Stendahl Shoe Store 10th and Nicollet	Exterior trim - Mantorville Dolomite Limestone - Ordovician - Galena
94	Vocational High School	Bedford, Indiana Limestone
98	West Minister Presbyterian Church 12th and Nicollet	Flatteville Limestone - very good example
104	Municipal Auditorium	Bedford, Indiana Limestone
105	Central Lutheran Church 5th and Grant	Bedford, Indiana Limestone
	Pillsbury Hall, U. of Minnesota Geology Building	Combination Fond du Lac Sandstone and Hinckley Buff Sandstone

SAME ARRANGED ALPHABETICALLY ACCORDING TO NAME OF BUILDING

<u>Building</u>	<u>Block No.</u>	<u>Stone</u>
Albrecht Fur Co., Nic. 8th to 9th	65	Base - Rockville Granite
Baker Bldg., 7th and 2nd Avenue S.	59	Base - Morton Gneiss (fine example) Above - Kettle River (Hinckley) Sandstone
Baker Co., Nicollet 5th to 6th	42	Base - West End - Black Gabbro, Ashland, Wis. 1st Story- Kasota Dolomite Base - East End - St. Cloud Rockville Granite
Boutelle,, 5th and Marquette	35	Base - St. Cloud Red Granite
Central Lutheran Church 5th and Grant	105	Bedford Indiana Limestone
Chatham Bldg., 1008-14 Nicollet	82	Winona Type Buff Dolomite Limestone
Court House, 3rd Ave. S. 4th to 5th	37	Ortonville Granite - polished blocks in 4th Street Entrance
Daytons Dept. Store	57	Base - St. Cloud Pink Granite
Farmers & Mechanics Savings Bank 6th and Marquette	42	Base - Red Granite, Milbank, S. D. Above - Kasota Dolomite Entrance - Montana Travertine
Federal Reserve Bank Bldg. 5th & Marq.	42	Rockville Porphyritic granite - fine example
First Nat. Bank Bldg. 513 Marquette	43	Base - Rockville Granite - good example

<u>Building</u>	<u>Block No.</u>	<u>Stone</u>
First Nat. Bank Bldg. Corner 5th and Marquette	43	Base - St. Cloud Pink (coarse) Granite
Foshay Tower	67	Indiana (Bedford) Limestone
Frontenac Bldg., 509 2nd Ave. S.	44	Base - Rockville Minnesota Granite Above - Indiana Limestone
Harolds, Nicollet 8th to 9th	65	Mankato Buff Dolomite
Hodson Bldg., 2nd Ave. S. & 4th St.	35	Base - Indiana Limestone
Home Trade Shoe Co., 924 Nicollet	73	Polished Tan Mankato Dolomite
Ivey Candy Store, 925 Nicollet	74	Base - Rockville Granite
Jacobs Jewelry Store, 811 Nicollet	66	Base - Rockville Granite - very fine example
Jewish Club, 2nd Ave. S. 7th to 8th	59	Base - Buff Kasota Stone - good example (new)
Kresge Bldg., Nicollet & 7th	49	Base - Rockville Porphyritic Granite
Ladd Bldg., Stendal Shoe Store 10th and Nicollet	83	Exterior trim - Mantorville Dolomitic Limestone - Ordovician - Galena
Lumber Exchange Bldg., 5th & Henn.	33	Fond du Lac Sandstone
Marquette Nat. Bank Bldg.	43	Base - St. Cloud Pink Granite Above - Handmade Red Sandstone (unknown)
517 Marquette	66	Base - Isle Granite - good example
Medical Arts Bldg., 9th & Nicollet	51	Morton Gneiss in panels - good example
Metropolitan Bank Bldg.	26	Base - Ortonville Granite Above - Fond du Lac Sandstone
6th and Second Avenue South	59	Entrance - Morton Gneiss - good example
Metropolitan Life Building	104	Combination Fond du Lac Sandstone and Hinckley Buff Sandstone
2nd Avenue S. and 3rd Street	36	Bedford, Indiana Limestone
Mpls. Gas Light Co., 8th & Marquette	50	Base - Morton Gneiss - fine example Above - Kasota Dolomite
Pillsbury Hall, U. of Minnesota Geology Building	50	Entrances on 6th and 7th - Vermont Gray Granite - Base - Black Gabbro, Mellon, Wis.
Municipal Auditorium	26	Fond du Lac Sandstone - good example
N. W. Bell Telephone Bldg.	74	St. Cloud (coarse) Pink Granite
3rd Ave. South and 5th St.	58	Base - Rockville Porphyritic Granite Entrance - Mankato Dolomite
N. W. National Bank Bldg.	34	Base - Morton Gneiss Above - Kasota Stone - Dolomite
620 Marquette	43	Base - St. Cloud Gray Granite Above - Indiana Limestone (fine marble in lobby)
Oneida Bldg., 4th & Marquette	59	Base - St. Cloud Pink Granite Above - Indiana Limestone
Phelps Bldg., 923 Nicollet	68	Flatteville Limestone lower beds Ordovician Age
Physicians & Surgeons Bldg.	1	Hinckley Sandstone
7th & Marquette	2	Base - St. Cloud Gray Granite Above - Mankato Dolomite
Powers Dept. Store, 5th & Nicollet	94	Bedford, Indiana Limestone
Rand Tower, 6th & Marquette	98	Flatteville Limestone - very good example
Ronoake Bldg., 7th & Marquette	58	Base - Black Gabbro, Mellon, Wis. fine example - Above - Indiana Limestone
St. Olaf's Church	74	Mankato Dolomite - good example
8th & 2nd Avenue South		
Union Depot		
U. S. Post Office		
Vocational High School		
West Minister Presbyterian Church		
Nicollet & 12th		
Woolworths, 7th and Nicollet		
Young & Quinlans, 9th & Nicollet		



PLACES OF GEOLOGIC INTEREST, IN MINNESOTA.

PLACES OF GEOLOGIC INTEREST IN MINNESOTA

CARLTON: Thomson Slates.

CROSBY-IRONTON: Iron mines of the Cuyuna Iron Range - Maganiferous Iron Ore.

DULUTH: Gabbro; intrusion of Thomson Slates by Gabbro; Duluth Harbor, Ancient beaches of Glacial Lake Duluth; (Boulevard Drive).

ELY: Soudan Iron Formation; Ely Greenstone - oldest known rock, (Archean Age). Underground hard Magnetite Ore Mines.

GRAND MARAIS: Minnesota "Thunder Eggs"; Lava flows.

HASTINGS: A number of well defined faults.

HIBBING: Center of Mesabi Iron Range - greatest iron ore mines in the world.

LAKE ITASCA: Source of the Mississippi River.

LAKEVILLE: Kansan, Illinoian and Wisconsin glacial drifts, in one road cut.

MANKATO: Contact between Cambrian and Ordovician; Kasota Building Stone quarries.

MINNEAPOLIS: St. Anthony Falls; Ice Block Lakes; Several old courses of the Mississippi River; Fossil Falls.

MOORHEAD: Glacial Lake Agassiz.

MOOSE LAKE: Shoreline and beach gravel of Glacial Lake Duluth.

MORTON: "Rainbow Granite" quarries. (gneiss).

NEW ULM: Sioux Quartzite, and excellent conglomerate.

NORTH SHORE: Basalt flows; Thomsonites;

ORTONVILLE: Ortonville Granite quarries.

PELICAN RAPIDS: Beaches and beach gravels of Lake Agassiz; Site of "The Minnesota Man".

PIPESTONE: Catlinite, famous Indian pipestone.

RED WING: Barn Bluff fault; contact of Cambrian and Ordovician.

REDWOOD FALLS: Granite outcrops: Cretaceous; decomposed granite, 100 feet thick.

ST. CLOUD: Granite Quarries: Center of the granite cutting and fabricating business.

SAGANAGA LAKE: Saganaga granite, Archean Age.

SANDSTONE: Quarries in Hinckley Sandstone, Keweenawan Age.

ST. PAUL: Shale pits of Twin City Brick Co. (Decorah).

SPRING VALLEY: Iron Ore deposits in limestone.

TAYLORS FALLS: Famous Pot Holes; abandoned gorge; a recent conglomerate; river terraces; extensive Keweenawan lava flows; Labradorian and Keewatin drifts.

# THE GEOLOGIC COLUMN

ERA	MILLION YEARS	PERIODS	OUTSTANDING EVENTS	LIFE	EDO-EON	MINNESOTA FORMATIONS
		Recent	Rise of civilization Development of man	Age of Man		Lenses, aluvium, and other recent deposits
						COAST RANGE REVOLUTION
						GAS CANADIAN REVOLUTION
C O I O N I C	40	Pleistocene	Stone-age man Glaciation extensive			Wisconsin Drift Eskerite Patriotite Iowan
	60	Pliocene Miocene Oligocene Eocene	Man Diverges from apes Mountains reach climate Mammals evolve rapidly Modern canals appear Extensive vulcanism in Eastern United States	Age of Mammals		Illinoian Kansan Nebraskan
						LAKAMIDE REVOLUTION
C O M O N I C	100	Cretaceous	Dinosaurs die out	Age		Coleraine (Benton) Formation Dakota Series Outlander member
	150	Jurassic	Beginning of Sierra Nevadas Large Dinosaurs appear			
	200	Triassic	First Dinosaurs Volcanic-Javelinas			
						AFFALACHIAN REVOLUTION
C O M O N I C	220	Permian	Extensive glaciation, Coal grid-like distribution of reptiles.	Age of Amphibians		
	260	Pennsylvanian	Subtropical climate, Coal measures.			
	300	Mississippian	Palaeozoic Alps—First land vertebrates.			
	360	Devonian	First Forests			
	400	Silurian	Long fishes—rise of land plants.	Age of Fishes		
	500	Ordovician	First fishes			
	570	Cambrian	Fossils abundant first time— trilobites and brachiopods dominant.	Invertebrate life dominant.		
						LIPALIAN INTERVAL
						KILLARNEY REVOLUTION
C O M O N I C	850	Keweenawan	Leaching of Bimblek Iron Formation - Extensive lava flows.	Evolution of Primitive forms of life		Hinchley-Pond-du-Lac Sandstone Duluth Gabbro Puckwung Formation
	1000	Upper Huronian Anishanabek	Great iron deposition Oldest glaciation			Virginia-Rose Shale Bimblek Iron Formation Foxglove-Stoux Quartzite.
						ALGOMIAN REVOLUTION
C O M O N I C		Middle Huronian	Intensive Folding	Evolution of uni-cellular life.		Algoma Granites Vernillion Range Giant's Range St. Cloud Granites
		Lower Huronian Taschisingue	Igneous Intrusives			Knife Lake Shale Ogishik Conglomerates
						LAURENTIAN REVOLUTION
C O M O N I C	1500	Laurentian	Rocks much altered	Primitive life		Sagamagan Granite
	2000	Keweenian	Geologic History Obscured			Sudan Iron Formation Ely Greenstones
	3000					COSMIC TIME